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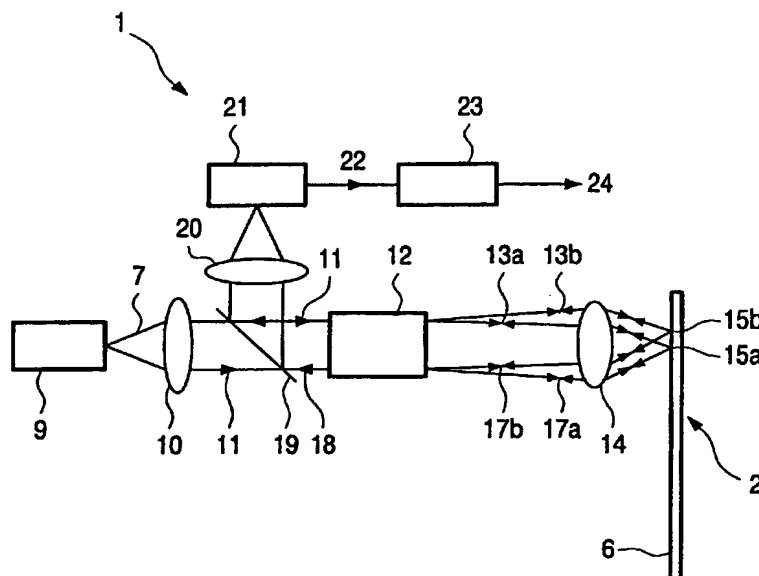
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— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH,

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(54) Title: OPTICAL SCANNING DEVICE



(57) Abstract: An optical scanning device 1 detects an information signal from an optical record carrier 2 using differential interference contrast. Two radiation beams 13a, 13b are generated and focused to two distinct spots 15a, 15b respectively displaced along a data track on the information layer of an optical record carrier. The relative positions of the spots in lands and pits can generate a path length difference between the reflected beams 17a, 17b. This path length difference causes the beams to interfere either constructively or destructively, depending on the relative land/pit position in the data track of the spots. This interference causes a detectable signal to be generated, the signal being representative of a transition from a pit to a land on the information layer 4 or vice versa.



CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE,

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B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 794 585 A (LEE WAI-HON) 27 December 1988 (1988-12-27) column 6, line 56 - column 13, line 25; figures	1-11
A	US 5 406 542 A (MORIMOTO YASUAKI) 11 April 1995 (1995-04-11) column 3, line 31 - column 5, line 44; figures	1,2,6
A	EP 0 837 455 A (THOMSON BRANDT GMBH) 22 April 1998 (1998-04-22) page 3, column 4, line 41 - page 6, column 9, line 32; figures	1,7
A	US 3 931 459 A (KORPEL ADRIANUS) 6 January 1976 (1976-01-06) column 2, line 35 - column G11B7	1



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Patent family members are listed in annex.

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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4794585	A	27-12-1988	US 4731772 A	15-03-1988
			DE 244827 T1	28-04-1988
			EP 0244827 A2	11-11-1987
			KR 9103043 B1	17-05-1991
			US 4918675 A	17-04-1990
			US 4905216 A	27-02-1990
			US 5001694 A	19-03-1991
			JP 63032743 A	12-02-1988
US 5406542	A	11-04-1995	DE 4026875 A1	27-02-1992
			DE 59102083 D1	04-08-1994
			WO 9203821 A1	05-03-1992
			EP 0544731 A1	09-06-1993
			ES 2057914 T3	16-10-1994
			HK 106195 A	07-07-1995
			HU 64638 A2	28-01-1994
			JP 6500192 T	06-01-1994
			KR 225305 B1	15-10-1999
			SG 9590467 A2	18-08-1995
EP 0837455	A	22-04-1998	DE 19643105 A1	23-04-1998
			CN 1180890 A	06-05-1998
			DE 69727186 D1	19-02-2004
			EP 0837455 A2	22-04-1998
			ID 18591 A	23-04-1998
			JP 10134408 A	22-05-1998
			SG 54568 A1	16-11-1998
			US 5905708 A	18-05-1999
US 3931459	A	06-01-1976	DE 2504571 A1	14-08-1975
			FR 2260164 A1	29-08-1975
			GB 1501454 A	15-02-1978
			IT 1031406 B	30-04-1979